CLAIMS

What is claimed is:

1. The process of establishing a plurality of nanotubes oriented in a selected manner, said process comprising the steps of:

establishing opposing surfaces; and

allowing a liquid containing randomly oriented nanotubes to recede so as to form opposing receding lines in the direction of said opposing surfaces.

2. The process of claim 1 further including the step of:

harvesting a plurality of nanotubes positioned in a preordained orientation with respect to said opposing surfaces, said harvesting step occuring after said liquid has receded a certain distance.

3. The process of claim 2 wherein said certain distance is at least substantially equal to the distance between said opposing surfaces.

4. The process of claim 1 further including the step of:

harvesting a plurality of nanotubes positioned in a preordained orientation with respect to said opposing surfaces, said harvesting step occuring after said liquid has receded to at least said opposing surfaces.

5. The process of claim 1 wherein said establishing step includes channels with sides;

wherein said allowing step includes the temporary placement of a cover across said sides, such that said nanotubes are established at the intersection of said cover and said channel sides.

6. The process of claim 5 further including the step of:

separating said cover from said sides when said opposing receding lines have receded at least to said sides.

7. The process of claim 1 wherein said establishing step includes the step of creating a laminar flow of materials.

8. The process of claim 7 wherein said laminar flow changes direction so as to attract certain of said randomly oriented nanotubes.

9. The method of selectively isolating a plurality of nanotubes, said method comprising the steps of:

placing a channelized mold on a surface, the channelized mold having at least one section of the channel open, the placement such that said surface covers said opening;

allowing a solution containing nanotubes to flow into said covered channel;

drying said solution; and

after said drying step, separating said mold and said surface such that nanotubes are deposited across said channel.

10. The method of claim 9 wherein said mold has a plurality of channels and wherein said surface covers all of said channels.

11. The method of claim 9 wherein said channel has positioned therein contours which effect the length of said nanotubes.

12. The method of claim 11 wherein at least one of said contours includes a tapered channel.

13. The method of claim 11 wherein at least one of said contours include indentions in a side wall of said channel.

14. The method of claim 11 wherein at least one portion of one of said channel side walls has a different solvent affinity.

15. The method of claim 9 wherein said deposited nanotubes are substantially parallel to each other.

16. The method of claim 9 wherein said deposited nanotubes are substantially all of the same length

17. The method of claim 9 wherein the length of each nanotube is a function of the geometry of the channel at the point in the channel that said nanotube is deposited.

18. The method of claim 9 wherein the mold is a PDMS micromold.

19. The method of claim 9 wherein the surface is silicon.

20. The method of claim 9 wherein said allowing step includes capillary action.

21. The method of claim 9 wherein said drying step occurs at room temperature.

22. The method of claim 21 wherein said room temperature is changed within domestic limits.

23. The method of claim 9 further including the steps of:

bringing said mold with said nanotubes created across a channel thereof into close proximity to a second surface; and

transferring at least some of said nanotubes from said mold to said second surface.

24. The method of claim 23 wherein said mold has a contour to allow selected nanotubes deposited thereon to be transferred to preselected locations on said second surface.

25. The method of claim 9 wherein said allowing step includes the step of allowing laminar flow of materials to control the length of each said deposited nanotube in said channel.

26. The method of suspending nanotubes, said method comprising the steps of:

placing a suspension of randomly organized nanotubes within a channel, said channel having spaced apart sides; and

allowing said suspension to dry so as to encourage certain nanotubes to become suspended across said channel sides.

27. The method of claim 26 wherein said suspended nanotubes are the ones long enough and positioned such that they extend across said channel while in said suspension.

28. The method of claim 26 wherein said channel is open along its longitudinal axis, said method further including the step of placing a temporary seal across said open channel portion.

29. The method of claim 28 further including the step of:

after said drying step removing said temporary seal.

30. The method of claim 26 wherein said channel sides are varied in width.

31. The method of claim 26 wherein said channel has a depth that is controlled.

32. The method of claim 26 wherein said placing step includes the step of flowing within said channel at least one material other than said nanotube suspension.

33. The method of claim 26 wherein said channel has positioned therein contours which effect the length of said suspended nanotubes.

34. The method of claim 33 wherein at least one of said contours includes a tapered channel.

35. The method of claim 33 wherein at least one of said contours include indentions in a side wall of said channel.

36. The method of claim 33 wherein at least one of said contours includes a difference in solvent affinity at a side wall of said channel.

37. The method of claim 26 wherein said suspended nanotubes are substantially parallel to each other.

38. The method of claim 26 wherein said suspended nanotubes are substantially all of the same length.

39. The method of claim 26 wherein the length of each suspended nanotube is a function of the geometry of the channel at the point in the channel that said nanotube is formed.

40. The method of claim 26 wherein the channel is included in a PDMS micromold.

41. The method of claim 28 wherein said seal is a silicon substrate.

42. The method of claim 26 wherein said placing step includes capillary action.

43. The method of claim 26 wherein said drying step occurs at room temperature.

44. The method of claim 43 wherein said room temperature is changed within domestic limits.

45. The method of claim 26 further including the steps of:

bringing said channel with said suspended nanotubes into substantial contact with a second surface for the purpose of transferring at least some of said suspended nanotubes from said channel to said second surface.

46. A system for the construction of a structure, said system comprising:

a channelized mold for forming therein a plurality of positioned nanotubes; and

a structure for receiving formed ones of said nanotubes from said mold.

47. The system of claim 46 wherein said nanotubes are formed in said channelized mold at substantially room temperature.

48. The system of claim 46 wherein said structure and said mold are constructed in a complementary mating relationship with each other.

49. A plurality of substantially parallel nanotubes constructed by the process of:

flowing a liquid into a confined space, said confined space having sides, said liquid containing at least some nanotubes in a random orientation with respect to said sides, said sides spaced apart from each other a distance less than the length of at least some of the nanotubes in said liquid; and

evaporating at least a portion of said liquid from said confined space such that at least some of said nanotubes which have lengths at least equal to said spaced apart distance become suspended between said sides of said confined space.

50. The method of claim 49 wherein said suspended nanotubes are substantially parallel to each other.

51. The method of claim 49 wherein during said evaporation process said confined space is covered and said liquid remains in contact with at least a portion of said cover during said evaporation process.

52. The method of claim 51 further including the step of separating said cover from said confined space at the conclusion of said evaporation process.

53. The method of claim 49 wherein said evaporation process includes the step of flowing at least a portion of said liquid out of said confined space.

54. The method of claim 49 wherein said flowing step includes the use of laminar flow.

55. The method of claim 49 further including the step of:

transfer printing said suspended nanotubes onto another surface.

56. A system for deriving substantially parallel nanotubes, said system comprising:

means, including defined boundaries, for confining a liquid containing randomly oriented nanotubes; and

means for allowing said liquid to dry while being confined by said defined boundaries so as to encourage certain of said nanotubes to become strung across said defined boundaries.

57. The system of claim 56 wherein said strung across nanotubes are all substantially parallel to each other.

58. The system of claim 56 wherein said confining means includes at least one geometric configuration adapted to control the length of said strung across nanotubes.

59. The system of claim 56 wherein said confining means includes at least one geometric configuration adapted to control the orientation of said strung across nanotubes.

60. The system of claim 56 wherein said allowing means includes at least one removable surface.

61. The system of claim 56 wherein said confining means includes a PDMS micromold.

62. The system of claim 56 wherein said liquid includes SWNT.

63. The system of claim 56 wherein said confining means includes contours which effect the length of said strung across nanotubes.

64. The system of claim 63 wherein at least one of said contours include indentions in a side wall.

65. The system of claim 63 wherein at least one of said contours includes areas of differing solvent affinity.

66. The system of claim 56 wherein said strung across nanotubes are substantially all of the same length.

67. The system of claim 56 wherein the length of each strung across nanotube is a function of the geometry of said confining means at the point that said nanotube is formed.

68. The system of claim 56 wherein said confining means includes means for allowing capillary action of said liquid within said defined boundaries.

69. The system of claim 56 wherein said drying occurs at room temperature.

70. The system of claim 56 further including means for raising said room temperature within domestic limits.

71. The system of claim 70 wherein said domestic limit is below the damage point of a nanotube to be strung across said defined boundaries.

72. The process of establishing a plurality of nanotubes having selected orientations; said process comprising the steps of:

flowing a plurality of materials through a defined course, at least one of said materials having contained therein nanotubes having random organization; and

establishing laminar flow with respect to said plurality of flowing materials such that certain of said nanotubes become suspended between a plurality of said materials.

73. The process of claim 72 further comprising the step of:

geometrically adjusting at least one of said materials such that the number of suspended nanotubes is changed.

74. The process of claim 73 wherein said adjustment is the change in direction of said defined course.